

LISTING OF THE CLAIMS

1. (Original) A method of increasing throughput of a server capable of servicing at least one TCP/IP connection with a client, the server creating a TCP/IP Transmission Control Block (TCB) stored in non-paged pool (NPP) memory containing information required to identify and to service the client connection, comprising the steps of:
  - closing a TCP/IP connection;
  - excluding information from the TCB not required to identify the client connection to form a timed-wait state TCB (TWTCB) for a time-wait period; and
  - releasing the NPP memory containing the information required to service the client connection.
2. (Original) The method of claim 1, wherein the step of excluding comprises the step of copying the information required to identify the client connection to form the TWTCB.
3. (Original) The method of claim 2, wherein the step of releasing the NPP memory containing the information required to service the client connection includes the step of releasing the NPP memory of the TCB required to identify the client connection.
4. (Original) The method of claim 1, wherein the step of excluding information not required to identify the client connection to form a TWTCB comprises the step of

maintaining a minimum of information necessary to avoid late-routed packets forming new connections on the server.

5. (Original) The method of claim 1, wherein the step of excluding information not required to identify the client connection to form a TWTCB comprises the step of establishing a TWTCB of the following structure:

```
struct TWTCB {  
  
#ifdef DEBUG  
    ulong      twtcb_sig;  
#endif  
    struct TWTCB  *twtcb_next;  
    IPAddress  twtcb_daddr;    // Destination IP address.  
    ushort     twtcb_dport;    // Destination port.  
    ushort     twtcb_sport;    // Source port.  
    uint       twtcb_partition;  
    ushort     twtcb_delta;  
    ushort     twtcb_rexmittimer;  
    Queue      twtcb_TWQueue; // Place to hold all the timed_waits  
    uint       twtcb_flags;  
    IPAddress  twtcb_saddr;    // Source IP address.  
    SeqNum     twtcb_senduna;  
#if 0 // TRIM_TWTCBREMOVE  
    SeqNum     twtcb_sendnext;  
#else  
    struct TWTCB  *twtcb_prev;  
#endif  
    SeqNum     twtcb_rcvnext;  
    uint       twtcb_phxsum;    // Precomputed pseudo-header xsum.  
    DEFINE_LOCK_STRUCTURE(twtcb_lock)  
  
    //ulong      twtcb_refcnt;  
    //SeqNum    twtcb_sendmax;  
    //uchar     twtcb_state;    // State of this TCB.  
    //RouteCacheEntry *twtcb_rce; // RCE for this connection.  
};
```

6. (Original) The method of claim 1, wherein the step of excluding information not required to identify the client connection to form a TWTCB comprises the step of establishing a TWTCB of the following structure:

```
struct TWTCB {  
  
#ifdef DEBUG  
    ulong    twtcb_sig;  
#endif  
    struct TWTCB *twtcb_next;  
    IPAddr  twtcb_daddr;        // Destination IP address.  
    ushort   twtcb_dport;       // Destination port.  
    ushort   twtcb_sport;       // Source port.  
    ushort   twtcb_delta;  
    ushort   twtcb_rexmittimer;  
    IPAddr  twtcb_saddr;       // Source IP address.  
  
    //ulong  twtcb_refcnt;  
    //SeqNum twtcb_sendmax;  
    //uchar  twtcb_state;       // State of this TCB.  
    //RouteCacheEntry  *twtcb_rce; // RCE for this connection.  
};
```

7. (Original) The method of claim 1, wherein the step of excluding information not required to identify the client connection comprises the step of forming a TWTCB that occupies less memory than the TCB.

8. (Original) The method of claim 7, wherein the step of forming a TWTCB that occupies less memory than the TCB comprises the step of forming a TWTCB that occupies approximately 96 bytes of memory.

9. (Original) The method of claim 7, wherein the step of forming a TWTCB that occupies less memory than the TCB comprises the step of forming a TWTCB that occupies approximately 64 bytes of memory.

10. (Original) The method of claim 7, wherein the step of forming a TWTCB that occupies less memory than the TCB comprises the step of forming a TWTCB that occupies approximately a single cache line.

11. (Original) A method for increasing the throughput of a server capable of servicing at least one TCP/IP connection, the server establishing a TCP/IP Transmission Control Block (TCB) of a size and containing information sufficient to identify and service the connection, comprising the steps of:

    closing the at least one TCP/IP connection;  
    forming a Timed-Wait TCB (TWTCB) of a size less than the TCB; and  
    releasing the TCB for use by the server.

12. (Original) The method of claim 11, wherein the step of forming a TWTCB comprises the step of copying a portion of the information of the TCB, the portion of information being sufficient to identify the TCP/IP connection to prevent late routed packets from forming new connections.

13. (Original) The method of claim 12, wherein the TCB occupies approximately 440 bytes of memory, and wherein the step of forming a TWTCB comprises the step of forming a TWTCB that occupies approximately 206 bytes of memory.

14. (Original) The method of claim 12, wherein the TCB occupies approximately 440 bytes of memory, and wherein the step of forming a TWTCB comprises the step of forming a TWTCB that occupies approximately 32 bytes of memory.

15. (Original) The method of claim 11, wherein the step of forming a TWTCB comprises the step of forming a TWTCB having the following structure:

```
struct TWTCB {  
  
#ifdef DEBUG  
    ulong      twtcb_sig;  
#endif  
    struct TWTCB  *twtcb_next;  
    IPAddr     twtcb_daddr;    // Destination IP address.  
    ushort     twtcb_dport;    // Destination port.  
    ushort     twtcb_sport;    // Source port.  
    uint       twtcb_partition;  
    ushort     twtcb_delta;  
    ushort     twtcb_rexmittimer;  
    Queue      twtcb_TWQueue; // Place to hold all the timed_waits  
    uint       twtcb_flags;  
    IPAddr     twtcb_saddr;    // Source IP address.  
    SeqNum     twtcb_senduna;  
#if 0 // TRIM_TWTCBREMOVE  
    SeqNum     twtcb_sendnext;  
#else  
    struct TWTCB  *twtcb_prev;  
#endif  
    SeqNum     twtcb_rcvnext;  
    uint       twtcb_phxsum;    // Precomputed pseudo-header xsum.
```

```
DEFINE_LOCK_STRUCTURE(twtcb_lock)

//ulong      twtcb_refcnt;
//SeqNum     twtcb_sendmax;
//uchar      twtcb_state;    // State of this TCB.
//RouteCacheEntry *twtcb_rce; // RCE for this connection.
};


```

16. (Original) The method of claim 11, wherein the step of forming a TWTCB comprises the step of forming a TWTCB having the following structure:

```
struct TWTCB {

#define DEBUG
    ulong  twtcb_sig;
#endif
    struct TWTCB *twtcb_next;
    IPAddr twtcb_daddr;        // Destination IP address.
    ushort twtcb_dport;        // Destination port.
    ushort twtcb_sport;        // Source port.
    ushort twtcb_delta;
    ushort twtcb_rexmittimer;
    IPAddr twtcb_saddr;        // Source IP address.

    //ulong  twtcb_refcnt;
    //SeqNum twtcb_sendmax;
    //uchar  twtcb_state;    // State of this TCB.
    //RouteCacheEntry *twtcb_rce; // RCE for this connection.

};


```

17. (Original) The method of claim 11, wherein the step of forming a TWTCB comprises the step of copying a portion of the information of the TCB, the portion of information being insufficient to service the TCP/IP connection.

18. (Original) A computer readable medium having computer-executable instructions for performing steps, comprising:
- closing a TCP/IP connection;
- copying less than all information stored in a TCP/IP Transmission Control Block (TCB) into a Timed-Wait TCB (TWTCB); and
- maintaining the TWTCB for a timed-wait period to avoid late-routed packets from establishing a new connection with a server.
19. (Original) The computer-readable medium of claim 18, wherein the step of copying less than all the information stored in a TCB into a TWTCB comprises the step of copying information sufficient to uniquely identify the TCP/IP connection.
20. (Original) The computer-readable medium of claim 18, further comprising the step of releasing memory used to store the TCB for use by the server after the step of copying less than all of the information stored in the TCB into a TWTCB.
21. (Original) The computer-readable medium of claim 18, wherein the step of copying less than all the information stored in a TCB into a TWTCB results in a structure for the TWTCB that fits on one cache line.

22. (Original) A computer-readable medium having stored thereon a data structure, consisting essentially of:

```
struct TWTCB {  
  
#ifdef DEBUG  
    ulong      twtcb_sig;  
#endif  
    struct TWTCB  *twtcb_next;  
    IPEndPoint  twtcb_daddr;    // Destination IP address.  
    ushort     twtcb_dport;    // Destination port.  
    ushort     twtcb_sport;    // Source port.  
    uint       twtcb_partition;  
    ushort     twtcb_delta;  
    ushort     twtcb_rexmittimer;  
    Queue     twtcb_TWQueue; // Place to hold all the timed_waits  
    uint       twtcb_flags;  
    IPEndPoint  twtcb_saddr;    // Source IP address.  
    SeqNum    twtcb_senduna;  
#if 0 // TRIM_TWTCBREMOVE  
    SeqNum    twtcb_sendnext;  
#else  
    struct TWTCB  *twtcb_prev;  
#endif  
    SeqNum    twtcb_rcvnext;  
    uint      twtcb_phxsum;    // Precomputed pseudo-header xsum.  
    DEFINE_LOCK_STRUCTURE(twtcb_lock)  
  
    //ulong      twtcb_refcnt;  
    //SeqNum    twtcb_sendmax;  
    //uchar     twtcb_state;    // State of this TCB.  
    //RouteCacheEntry *twtcb_rce; // RCE for this connection.  
};
```

23. (Original) A computer-readable medium having stored thereon a data structure, consisting essentially of:

```
struct TWTCB {  
  
#ifdef DEBUG  
    ulong    twtcb_sig;  
#endif  
    struct TWTCB *twtcb_next;  
    IPAddr  twtcb_daddr;        // Destination IP address.  
    ushort   twtcb_dport;       // Destination port.  
    ushort   twtcb_sport;       // Source port.  
    ushort   twtcb_delta;  
    ushort   twtcb_rexmittimer;  
    IPAddr  twtcb_saddr;       // Source IP address.  
  
    //ulong  twtcb_refcnt;  
    //SeqNum twtcb_sendmax;  
    //uchar  twtcb_state;       // State of this TCB.  
    //RouteCacheEntry  *twtcb_rce; // RCE for this connection.  
};
```